

Data Validation Package

December 2007
Groundwater Sampling at
the Monument Valley, Arizona,
Processing Site

March 2008



U.S. Department of Energy
Office of Legacy Management

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Sampling Event Summary

Site: Monument Valley, Arizona, Processing Site

Sampling Period: December 18–19, 2007

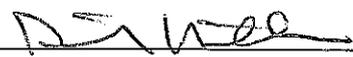
Nineteen groundwater samples were collected at the Monument Valley, Arizona, Processing Site to monitor groundwater contaminants as specified in the *Final Site Observational Work Plan for the UMTRA Project Site at Monument Valley, Arizona* (April 1999). Water levels were measured at each sampled well. Sampling and analysis was conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (DOE 2006). Duplicate samples were collected from location 0657. Time-concentration plots for ammonia, nitrate, sulfate, uranium, and vanadium are included with the results data. The data from this sampling event are consistent with values previously obtained. Increasing uranium concentrations in well 0662 have been previously noted and continue with the data from this sampling event after a decrease was noted in June 2007. There are no corresponding increases in the nitrate or sulfate concentrations that would indicate contaminant movement. Ongoing erosion of a former uranium mine located upgradient from the site may be contributing to the increasing uranium concentrations at this location. The increasing nitrate concentration in wells 0761, 0762, and 0764 as indicated on the time-concentration graphs is consistent with downgradient movement of the contaminant plume. Wells with analyte concentrations that exceeded U.S. Environmental Protection Agency (EPA) groundwater standards are listed in Table 1.

Table 1. Monument Valley Locations That Exceed Standards

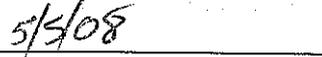
Comparison to UMTRCA Maximum Groundwater Concentration Standards
 Laboratory: PARAGON (Fort Collins, CO)
 Requisition Index Number (RIN): 07121310
 Report Date: 02/14/2008

Analyte	Standard ^a	Site Code	Location	Concentration
Nitrate + Nitrite as Nitrogen	10	MON01	0606	220
			0655	100
			0656	22
			0662	24
			0761	37
			0762	79
			0764	42
			0765	120
			0770	17
			0771	180
Uranium	0.044	MON01	0662	0.66

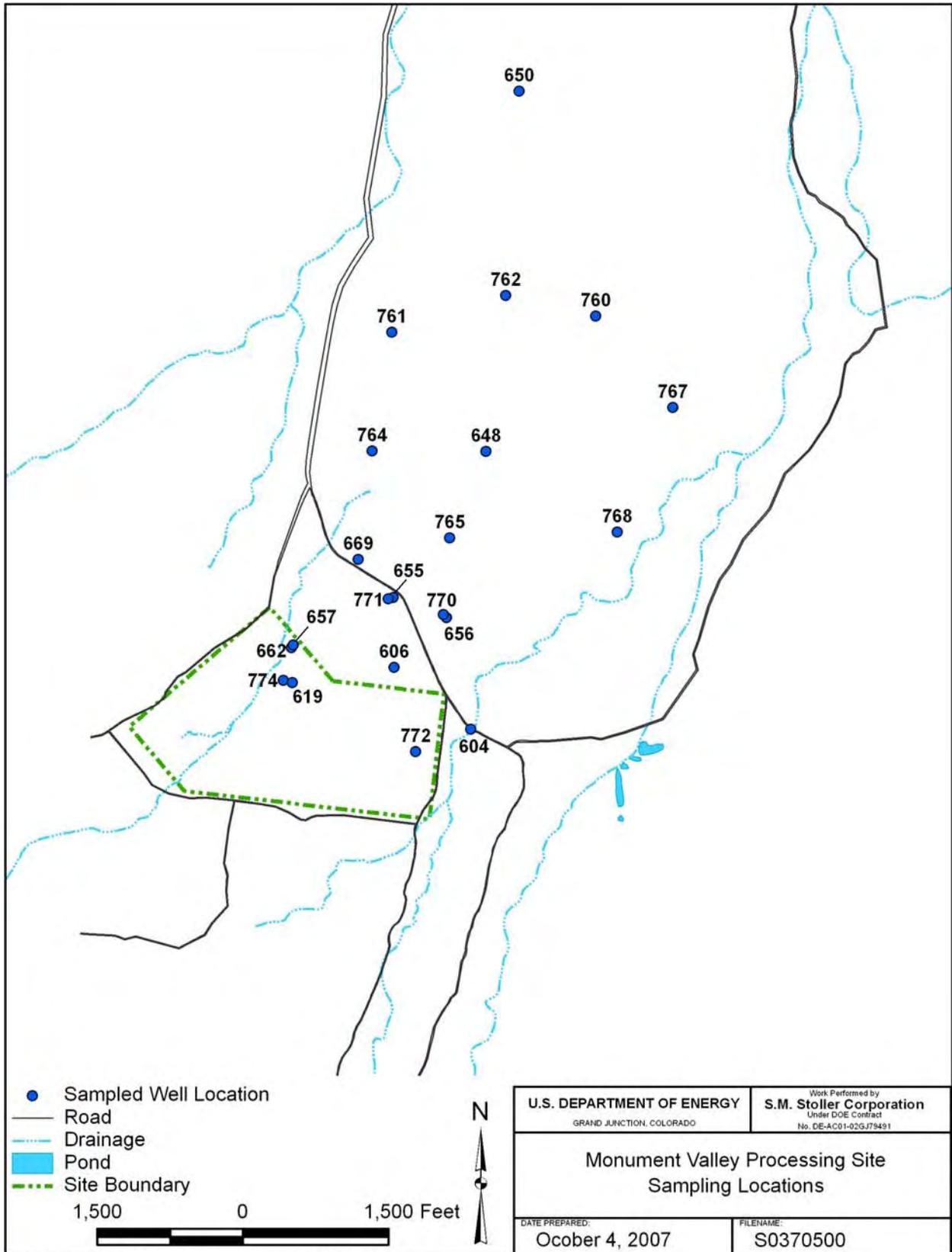
^aStandards are listed in 40 CFR 192.02 Table 1 to Subpart A; units are in mg/L.



David Miller
 Site Lead, S.M. Stoller



Date



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Monument Valley, Arizona, Processing Site Sample Locations

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Monument Valley, Arizona	Date(s) of Water Sampling	December 18–19, 2007
Date(s) of Verification	February 15, 2008	Name of Verifier	Steve Donovan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures? List other documents, SOPs, instructions.	Yes	Work order letter dated November 7, 2007
2. Were the sampling locations specified in the planning documents sampled?	Yes	
3. Was a pre-trip calibration conducted as specified in the above-named documents?	Yes	Pre-trip calibration was performed on December 14, 2007.
4. Was an operational check of the field equipment conducted twice daily? Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Was the category of the well documented?	Yes	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	No	The turbidity requirement was not met at well 0760.
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected from well 0657.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	No equipment blank was needed because all wells are equipped with either dedicated downhole and pumphead tubing or a bladder pump.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were QC samples assigned a fictitious site identification number?	Yes	Location ID 2417 was assigned to the duplicate sample from location 0657.
Was the true identity of the samples recorded on the Quality Assurance Sample Log?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	Samples were filtered as specified in the Sampling and Analysis Plan.
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Are field data sheets signed and dated by both team members?	Yes	
18. Was all other pertinent information documented on the field data sheets?	Yes	
19. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
20. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN): 07121310
Sample Event: December 18–19, 2007
Site(s): Monument Valley, Arizona
Laboratory: Paragon Analytics, Fort Collins, Colorado
Work Order No.: 0712172
Analysis: Metals and Inorganics
Validator: Steve Donivan
Review Date: February 13, 2008

This validation was performed according to the *Environmental Procedures Catalog* (STO 6), “Standard Practice for Validation of Laboratory Data,” GT-9(P) (2006). The procedure was applied at Level 3, Data Deliverables Verification. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 2.

Table 2. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Ammonia as N, NH ₃ -N	WCH-A-005	MCAWW 350.1	MCAWW 350.1
Chloride	MIS-A-039	SW-856 9056	SW-856 9056
Gross Alpha/Beta	GPC-A-001	SOP702R19	SOP724R10
Nitrite + Nitrate as N, NO ₂ +NO ₃ -N	WCH-A-022	MCAWW 353.2	MCAWW 353.2
Radium-226	ASP-A-016	SOP783R7	SOP783R7
Radium-228	GPC-A-020	SOP746R8	SOP724R10
Sulfate	MIS-A-044	SW-856 9056	SW-856 9056
Uranium	GJO-01	SW-846 3005A	SW-846 6020A
Uranium Isotopes	GJO-05	SOP776R11	SOP714R11
Vanadium	GJO-18	SW-846 3005A	SW-846 6020A

Data Qualifier Summary

Analytical results were qualified as listed in Table 3. Refer to the sections below for an explanation of the data qualifiers applied.

Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received 22 water samples on December 21, 2007, under air bill number 8605 0109 7022 accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed on the form with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents, including the COC forms and the sample tickets, had no errors or omissions.

Table 3. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
All counted on 1/25/2008	All counted on 1/25/2008	Radium-228	R	Failed daily background check
0712172-2	0606	Vanadium	U	Less than 5 times the calibration blank
0712172-5	0656	Vanadium	U	Less than 5 times the calibration blank
0712172-9	0760	Vanadium	U	Less than 5 times the calibration blank
0712172-14	0767	Vanadium	U	Less than 5 times the calibration blank
0712172-15	0768	Vanadium	J	Detection limit check failure
0712172-15	0768	Uranium	U	Less than 5 times the calibration blank
0712172-16	0770	Vanadium	U	Less than 5 times the calibration blank

Preservation and Holding Times

The sample shipment was received intact with the temperature within the chilled cooler of 1.6 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods.

Method MCAWW 350.1, Ammonia as N

The initial calibration was performed using six calibration standards on January 9, 2008, resulting in a calibration curve with a correlation coefficient value greater than 0.995 and an intercept less than 3 times the method detection limit (MDL). Initial calibration verification (ICV) and continuing calibration verification (CCV) checks were made at the required frequency, resulting in five CCVs that met the acceptance criteria.

Method MCAWW 353.2, Nitrite + Nitrate as N

The initial calibration was performed using seven calibration standards on December 28, 2007, resulting in a calibration curve with a correlation coefficient value greater than 0.995 and an intercept less than 3 times the MDL. ICV and CCV checks were made at the required frequency, resulting in six CCVs that met the acceptance criteria.

Method SW-846 6020A, Uranium and Vanadium

Calibrations for uranium were performed on December 28, 2007. Calibrations for vanadium were performed on January 2, 2008. The initial calibrations were performed using eight calibration standards, resulting in calibration curves with correlation coefficient values greater than 0.995. The absolute values of the curve intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. ICV and CCV checks were made at the required frequency, resulting in ten CCVs for uranium and seven CCVs for vanadium. All calibration checks met the acceptance criteria. Reporting limit verification checks (CRIs) were made at the beginning of each analytical sequence to verify the linearity of the calibration curve near the practical quantitation limit. Uranium results were acceptable; the vanadium CRI result was below the acceptance range. The vanadium results that were less than 5 times the practical quantitation limit and above the detection limit are qualified with a “J” flag (estimated). Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 9056, Chloride and Sulfate

Initial calibrations were performed using five calibration standards on December 31, 2007. The calibration curve correlation coefficient values were greater than 0.995 and intercepts less than 3 times the MDL. Initial calibration and calibration check standards were prepared from independent sources. ICV and CCV checks were made at the required frequency, resulting in seven CCVs. All calibration checks met the acceptance criteria.

Radiochemical Analysis

Radiochemical results are qualified with a “J” flag (estimated) when the result is greater than the minimum detectable concentration (MDC), but less than 3 times the MDC. Radiochemical results are qualified with a “U” flag (not detected) when the result is greater than the MDC but less than the two sigma total propagated uncertainty (TPU).

Alpha Spectrometry

Alpha spectrometry calibrations were performed on January 15, 2008. Instrument backgrounds were determined on January 15, 2008. All daily instrument calibration and background checks met the acceptance criteria. The chemical recoveries met the acceptance criteria of 30 percent to 110 percent for all samples. The full width at half maximum (FWHM) was reviewed for all analyses to evaluate the spectral resolution. All internal standard peak FWHM values were below 100, demonstrating acceptable resolution. All internal standard peaks were within 50 keV of the expected position. The regions-of-interest (ROIs) for analyte peaks were reviewed. No manual integrations were performed, and all ROIs were satisfactory.

Gross Alpha/Beta

Plateau calibrations were performed on September 18, 2007. Alpha and beta attenuation calibrations were performed on September 28, 2007, covering a range of 19 to 136 milligrams (mg). All standards were counted to a minimum of 10,000 counts. All calibration and background checks met acceptance criteria. The residual mass was less than 100 mg for all samples.

Radium-226

Emanation cell plateau voltage determinations were performed on June 25, 2007, and cell efficiency calibrations were performed July 3, 2007. Daily efficiency calibration and background checks were performed on January 16, 2008. All calibration data met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Radium-228

Plateau voltage determinations were performed on November 7, 2007, and detector efficiency calibrations were performed on November 8, 2007. Daily efficiency calibration and background checks were performed on January 3 and 25, 2008. All calibration data met the acceptance criteria with the exception of data from January 25, 2008. The associated sample data are qualified with an “R” flag as rejected because the samples were counted using detectors that failed the daily background check. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis.

Metals and Inorganics

All method blank and initial and continuing calibration blank results associated with the samples were below the practical quantitation limits. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a “U” flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

Radiochemical Analysis

The gross alpha, gross beta, radium-226, radium-228, and uranium isotope method blank results were less than 1.65 times the respective TPU or below the MDC.

Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

ICP interference check samples ICSA and ICSAB were analyzed at the required frequency to verify the instrumental interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The spike recoveries met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

The laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference values for the matrix spike duplicate sample results were less than 20 percent. The radiochemical relative error ratio was less than 3.0 for all duplicates, demonstrating acceptable precision.

Laboratory Control Samples (LCS)

LCS were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS results were acceptable for all analytes with the following exception.

The radium-228 LCS and LCSD had recoveries of less than 75 percent. The samples were reanalyzed with the LCS again failing to meet recovery requirements. Both sets of data were reported. The data from the reanalysis are qualified with an "R" flag as rejected because the samples were counted using detectors that failed the daily background check.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Metals serial dilution data are evaluated when the concentration of the undiluted sample is greater than 100 times the practical quantitation limit. All evaluated serial dilution data were acceptable.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The samples were diluted prior to analysis of uranium and vanadium to reduce interferences. The required detection limits were met for all non-radiochemical analytes.

All radiochemical MDCs were calculated using data from a blank population and the following equation.

$$MDC = \frac{3.29 \times S_b \times \sqrt{1 + \frac{CT_s}{CT_b}}}{KT} + \frac{3}{KT}$$

Where:

S_b = Standard deviation of the blank population counts

K = Efficiency factor

T = Count time in minutes

CT_b = Count time for blanks

CT_s = Count time for sample

The calculation of the MDCs using the equation above was verified. The required MDCs were not met for gross alpha, gross beta, and uranium isotopes for sample 0662. The sample results are all greater than 10 times the MDC.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Chromatography Peak Integration

The integration of analyte peaks was reviewed for all ion chromatography data. There were no manual integrations performed, and all peak integrations were satisfactory.

Electronic Data Deliverable (EDD) File

The revised EDD file arrived on February 4, 2008. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure that all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

EDD Non-Conformance Report

Report Date: 2/13/2008

EDD File: \\condor\sms\07121310\07121310.txt

EDD Errors: 5

Record	Error Type	Field	Error Description
88	Duplicate Value	Result	Duplicate Results Ra-228 for ticket NFD 463
89	Duplicate Value	Result	Duplicate Results Ra-228 for ticket NFD 464
90	Duplicate Value	Result	Duplicate Results Ra-228 for ticket NFD 462
153	Duplicate Value	Result	Duplicate Results Ra-228 for ticket NFK 742
154	Duplicate Value	Result	Duplicate Results Ra-228 for ticket NFD 461

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 07121310 Lab Code: PAR Validator: Steve Donovan Validation Date: 2/14/2008
Project: Monument Valley Analysis Type: Metals General Chem Rad Organics
of Samples: 20 Matrix: WATER Requested Analysis Completed: Yes

Chain of Custody

Present: OK Signed: OK Dated: OK

Sample

Integrity: OK Preservation: OK Temperature: OK

Select Quality Parameters

- Holding Times
- Detection Limits
- Field/Trip Blanks
- Field Duplicates

All analyses were completed within the applicable holding times.

There are 5 detection limit failures.

There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: Detection Limits

RIN: 07121310 Lab Code: PAR

Project: Monument Valley

Validation Date: 2/14/2008

Ticket	Location	Lab Sample ID	Method Code	Lab Method	Analyte Name	Result	Qualifier	Reported Detection Limit	Required Detection Limit	Units
NFD 463	662	0712172-7	GPC-A-001	SOP724R10	GROSS ALPHA	426		2.5	2	pCi/L
NFD 463	662	0712172-7	GPC-A-001	SOP724R10	GROSS BETA	125		5.32	4	pCi/L
NFD 463	662	0712172-7	LMR-02	SOP714R11	J-234	233		0.612	0.1	pCi/L
NFD 463	662	0712172-7	LMR-02	SOP714R11	J-235	10.3		0.21	0.1	pCi/L
NFD 463	662	0712172-7	LMR-02	SOP714R11	J-238	230		0.178	0.1	pCi/L

SAMPLE MANAGEMENT SYSTEM
Wet Chemistry Data Validation Worksheet

RIN: 07121310 **Lab Code:** PAR **Date Due:** 1/18/2008
Matrix: Water **Site Code:** MON **Date Completed:** 2/5/2008

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
Ammonia as N	01/09/2008	-0.013	0.9999	OK	OK	OK	OK	OK	102.0	89.0	85.0	5.00	
Chloride	12/31/2007	0.000	0.9999	OK	OK	OK	OK	OK	98.0	105.0	108.0	2.00	
Nitrate+Nitrite as N	12/28/2007	0.000	0.9999	OK	OK	OK	OK	OK	104.0	104.0	102.0	2.00	
Sulfate	12/31/2007	0.000	0.9999	OK	OK	OK	OK	OK	98.0	95.0	98.0	1.00	

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 07121310 Lab Code: PAR Date Due: 1/18/2008
 Matrix: Water Site Code: MON Date Completed: 2/5/2008

Analyte	Date Analyzed	CALIBRATION						Method	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
Uranium	12/28/2007	0.0000	1.0000	OK	OK	OK	OK		108.0	108.0	0.0	108.0	1.0	94.0	
Vanadium	12/28/2007	0.0050	1.0000	OK	OK	OK	OK		94.0	86.0	6.0	110.0		56.0	

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 07121310 **Lab Code:** PAR **Date Due:** 1/18/2008
Matrix: Water **Site Code:** MON **Date Completed:** 2/5/2008

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
MS	Gross Alpha	01/08/2008					103.0	
0657 Duplicate	Gross Alpha	01/08/2008						0.27
Method Blank	Gross Alpha	01/08/2008	-0.0682	U				
LCS	Gross Alpha	01/08/2008				112.0		
0657 Duplicate	Gross Beta	01/08/2008						1.16
LCS	Gross Beta	01/08/2008				104.0		
Method Blank	Gross Beta	01/08/2008	-0.9730	U				
MS	Gross Beta	01/08/2008					105.0	
0657	Radium-226	01/16/2008			80.9			
0662	Radium-226	01/16/2008			82.6			
0657 Duplicate	Radium-226	01/16/2008			81.2			
0774	Radium-226	01/16/2008			80.4			
LCSD	Radium-226	01/16/2008			82.0	95.3		1.43
0619	Radium-226	01/16/2008			76.1			
Method Blank	Radium-226	01/16/2008	-0.3640	U	82.2			
LCS	Radium-226	01/16/2008			83.3	73.6		
0657	Radium-228	01/03/2008			69.0			
0662	Radium-228	01/03/2008			69.3			
0774	Radium-228	01/03/2008			68.3			
0657 Duplicate	Radium-228	01/03/2008			67.8			
LCSD	Radium-228	01/03/2008			73.8	74.7		0.13
0619	Radium-228	01/03/2008			72.4			
Method Blank	Radium-228	01/03/2008	0.5600	U	65.8			
LCS	Radium-228	01/03/2008			72.2	72.6		
Method Blank	Uranium-233+234	01/20/2008	0.0384		77.4			
LCSD	Uranium-233+234	01/20/2008			77.0	98.8		0.14
LCS	Uranium-233+234	01/20/2008			75.8	97.1		
Method Blank	Uranium-235	01/20/2008	0.0379	U				
0657	Uranium-238	01/20/2008			35.6			
0662	Uranium-238	01/20/2008			54.5			
0774	Uranium-238	01/20/2008			80.5			
0657 Duplicate	Uranium-238	01/20/2008			79.4			

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 07121310 **Lab Code:** PAR **Date Due:** 1/18/2008
Matrix: Water **Site Code:** MON **Date Completed:** 2/5/2008

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
LCS	Uranium-238	01/20/2008				104.0		
LCSD	Uranium-238	01/20/2008				98.0		0.51
Method Blank	Uranium-238	01/20/2008	0.0038	U				
0619	Uranium-238	01/20/2008			78.9			

Sampling Quality Control Assessment

The following information summarizes and assesses quality control for this sampling event.

Sampling Protocol

Sample results for monitor wells were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Additionally wells 0764 and 0771 were qualified with a “Q” flag, indicating the data are qualitative because these wells were classified as Category II. Well 0760 was qualified with a “Q” flag because the turbidity criterion was not met during purging.

Equipment Blank Assessment

Collection and analysis of an equipment blank was not performed because all samples were collected with dedicated bladder pumps or dedicated tubing.

Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. Duplicate samples were collected from location 0657. The duplicate results were acceptable, meeting the EPA recommended laboratory duplicate criteria of less than 20 percent relative difference for results that are greater than 5 times the practical quantitation limit, and the radiochemical relative error ratio was less than 3.0 for all duplicates, demonstrating acceptable precision.

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 07121310 Lab Code: PAR Project: Monument Valley Validation Date: 2/13/2008

Duplicate: 2417

Sample: 657

Analyte	Sample			Duplicate			RPD	RER	Units
	Result	Flag	Error	Result	Flag	Error			
AMMONIA AS N	0.1	U		0.1	U				MG/L
CHLORIDE	6.5			6.6			1.53		MG/L
GROSS ALPHA	14.3		2.48	12.9		2.23	10.29	0.8	pCi/L
GROSS BETA	5.99		1.39	6.54		1.38		0.6	pCi/L
NITRATE/NITRITE AS N	2.9			3.3			12.90		MG/L
Ra-226	-0.033	U	0.317	-0.0319	U	0.367		0	pCi/L
Ra-228	0.546	U	0.349	0.478	U	0.358		0.3	pCi/L
Ra-228	0.546	U	0.349	0.4	U	0.715		0.4	pCi/L
SULFATE	43			40			7.23		MG/L
U-234	9.28		1.76	8		1.33	14.81	1.1	pCi/L
U-235	0.36		0.15	0.375		0.108	4.08	0.2	pCi/L
U-238	8.61		1.64	7.32		1.22	16.20	1.2	pCi/L
URANIUM	24			23			4.26		UG/L
VANADIUM	64			62			3.17		UG/L

Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the SEEPro database reports are defined on the last page of each report. All data in this package are considered validated and available for use.

Laboratory Coordinator:

Steve Donovan
Steve Donovan

5-6-08
Date

Data Validation Lead:

Steve Donovan
Steve Donovan

5-6-08
Date

Attachment 1
Assessment of Anomalous Data

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Outliers Report

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Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the SEEPro database. The application compares the new data set with historical data and lists all new data that fall outside the historical data range. Data listed in the report are highlighted if the concentration detected is not within 50 percent of historical minimum or maximum values. A determination is also made if the data are normally distributed using the Studentized Range Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when there are less than or equal to 25 data points. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers when there are 25 or more data points. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition.

The ammonia result for well 0770 was identified as a potential outlier because of the low variability of the historical data. There were no errors identified with the ammonia data, and the results from this sampling event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters

Laboratory: PARAGON (Fort Collins, CO)

RIN: 07121310

Comparison: All Historical Data

Report Date: 3/3/2008

Site Code	Location Code	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Count		Normally Distributed	Statistical Outlier
				Result	Qualifiers Lab	Data	Result	Qualifiers Lab	Data	Result	Qualifiers Lab	Data	N	N Below Detect		
MON01	0619	12/19/2007	Chloride	5.2		F	8			5.21			16	0	Yes	No
MON01	0619	12/19/2007	Gross Alpha	12		F	91			17.5		F	9	0	Yes	No
MON01	0657	12/19/2007	Radium-226	-0.0319	U	F	0.4		F	0		F	12	3	Yes	No
MON01	0662	12/19/2007	Gross Alpha	426		F	361		F	0	N		14	1	Yes	No
MON01	0662	12/19/2007	Gross Beta	125		F	105		F	0	N		14	3	Yes	No
MON01	0662	12/19/2007	Nitrate + Nitrite as Nitrogen	24		F	16.3			7.2		F	7	0	Yes	No
MON01	0662	12/19/2007	Radium-226	-0.031	U	F	0.9			0			11	3	No	No
MON01	0662	12/19/2007	Uranium	0.66		F	0.52		F	0.013			26	0	No	No
MON01	0760	12/18/2007	Vanadium	0.0001	B	UFQ	0.013	U		0.00012	B	FJ	9	7	No	No
MON01	0761	12/18/2007	Nitrate + Nitrite as Nitrogen	37		F	28		F	24		F	7	0	No	Yes
MON01	0764	12/18/2007	Vanadium	0.016		FQ	0.014		F	0.004	U		8	2	Yes	No
MON01	0765	12/18/2007	Ammonia Total as N	150		F	140		F	120		F	5	0	No	No
MON01	0767	12/18/2007	Sulfate	35		F	34		F	26.9			15	0	Yes	No
MON01	0768	12/18/2007	Chloride	13		F	106			15		F	12	0	No	No
MON01	0770	12/18/2007	Ammonia Total as N	40		F	36		F	35		F	5	0	Yes	Yes
MON01	0770	12/18/2007	Nitrate + Nitrite as Nitrogen	17		F	23		F	20		F	5	0	Yes	No
MON01	0771	12/18/2007	Nitrate + Nitrite as Nitrogen	180		FQ	170		FQ	150		F	5	0	Yes	No
MON01	0772	12/19/2007	Ammonia Total as N	7.9		F	7.7		F	3.1		F	5	0	Yes	No

Data Validation Outliers Report - No Field Parameters

Laboratory: PARAGON (Fort Collins, CO)

RIN: 07121310

Comparison: All Historical Data

Report Date: 3/3/2008

Site Code	Location Code	Sample Date	Analyte	Result	Current Qualifiers		Historical Maximum Qualifiers			Historical Minimum Qualifiers			Count		Normally Distributed	Statistical Outlier
					Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect		
MON01	0774	12/19/2007	Uranium	0.04		F	0.0726			0.048		F	14	0	Yes	No
MON01	0774	12/19/2007	Vanadium	0.02		F	0.019	E	F	0.015		F	8	0	Yes	No

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X,Y,Z Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique.
- X Location is undefined.
- J Estimated value.
- R Unusable result.

STATISTICAL TESTS:

The distribution of the data is tested for normality using the Studentized Range Test

Outliers are identified using Dixon's Test when there are 25 or fewer data points.

Outliers are identified using Rosner's Test when there are 26 or more data points.

See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

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Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0604 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	13	- 28	178		F	#		
Ammonia Total as N	mg/L	12/18/2007	N001	13	- 28	0.1	U	F	#	.1	
Chloride	mg/L	12/18/2007	N001	13	- 28	11		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	13	- 28	0.02		F	#	.01	
Oxidation Reduction Potential	mV	12/18/2007	N001	13	- 28	33.2		F	#		
pH	s.u.	12/18/2007	N001	13	- 28	8.25		F	#		
Specific Conductance	umhos /cm	12/18/2007	N001	13	- 28	603		F	#		
Sulfate	mg/L	12/18/2007	N001	13	- 28	130		F	#	2.5	
Temperature	C	12/18/2007	N001	13	- 28	15.08		F	#		
Turbidity	NTU	12/18/2007	N001	13	- 28	1.23		F	#		
Uranium	mg/L	12/18/2007	N001	13	- 28	0.0022		F	#	.000012	
Vanadium	mg/L	12/18/2007	N001	13	- 28	0.0024		F	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0606 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/19/2007	N001	32	- 42	221		F	#		
Ammonia Total as N	mg/L	12/19/2007	N001	32	- 42	130		F	#	10	
Chloride	mg/L	12/19/2007	N001	32	- 42	13		F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	12/19/2007	N001	32	- 42	220		F	#	2	
Oxidation Reduction Potential	mV	12/19/2007	N001	32	- 42	148		F	#		
pH	s.u.	12/19/2007	N001	32	- 42	6.91		F	#		
Specific Conductance	umhos /cm	12/19/2007	N001	32	- 42	2831		F	#		
Sulfate	mg/L	12/19/2007	N001	32	- 42	420		F	#	10	
Temperature	C	12/19/2007	N001	32	- 42	13.4		F	#		
Turbidity	NTU	12/19/2007	N001	32	- 42	0.64		F	#		
Uranium	mg/L	12/19/2007	N001	32	- 42	0.009		F	#	.000012	
Vanadium	mg/L	12/19/2007	N001	32	- 42	0.00036		UF	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0619 WELL Water Use Permit No. 92-082.

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/19/2007	N001	103.9	- 153.9	150		F	#		
Ammonia Total as N	mg/L	12/19/2007	N001	103.9	- 153.9	0.1	U	F	#	.1	
Chloride	mg/L	12/19/2007	N001	103.9	- 153.9	5.2		F	#	.4	
Gross Alpha	pCi/L	12/19/2007	N001	103.9	- 153.9	12		F	#	.54	2.09
Gross Beta	pCi/L	12/19/2007	N001	103.9	- 153.9	6.93		F	#	1.28	1.41
Nitrate + Nitrite as Nitrogen	mg/L	12/19/2007	N001	103.9	- 153.9	1.7		F	#	.01	
Oxidation Reduction Potential	mV	12/19/2007	N001	103.9	- 153.9	97		F	#		
pH	s.u.	12/19/2007	N001	103.9	- 153.9	7.57		F	#		
Radium-226	pCi/L	12/19/2007	N001	103.9	- 153.9	0	U	F	#	.668	.363
Radium-228	pCi/L	12/19/2007	N001	103.9	- 153.9	0.278	U	F	#	.582	.296
Radium-228	pCi/L	12/19/2007	N003	103.9	- 153.9	0.251	U	RF	#	.983	.476
Specific Conductance	umhos/cm	12/19/2007	N001	103.9	- 153.9	398		F	#		
Sulfate	mg/L	12/19/2007	N001	103.9	- 153.9	43		F	#	1	
Temperature	C	12/19/2007	N001	103.9	- 153.9	15.3		F	#		
Turbidity	NTU	12/19/2007	N001	103.9	- 153.9	0.88		F	#		
Uranium	mg/L	12/19/2007	N001	103.9	- 153.9	0.023		F	#	.000012	
Uranium-234	pCi/L	12/19/2007	N001	103.9	- 153.9	8.39		F	#	.0779	1.4

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0619 WELL Water Use Permit No. 92-082.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Uranium-235	pCi/L	12/19/2007	N001	103.9	- 153.9	0.356		F	#	.0442	.107
Uranium-238	pCi/L	12/19/2007	N001	103.9	- 153.9	8.26		F	#	.0578	1.38
Vanadium	mg/L	12/19/2007	N001	103.9	- 153.9	0.022		F	#	.00016	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0655 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	38	- 58	259		F	#		
Ammonia Total as N	mg/L	12/18/2007	N001	38	- 58	55		F	#	5	
Chloride	mg/L	12/18/2007	N001	38	- 58	28		F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	38	- 58	100		F	#	1	
Oxidation Reduction Potential	mV	12/18/2007	N001	38	- 58	163		F	#		
pH	s.u.	12/18/2007	N001	38	- 58	7.43		F	#		
Specific Conductance	umhos /cm	12/18/2007	N001	38	- 58	3703		F	#		
Sulfate	mg/L	12/18/2007	N001	38	- 58	1900		F	#	10	
Temperature	C	12/18/2007	N001	38	- 58	14.2		F	#		
Turbidity	NTU	12/18/2007	N001	38	- 58	0.44		F	#		
Uranium	mg/L	12/18/2007	N001	38	- 58	0.015		F	#	.000012	
Vanadium	mg/L	12/18/2007	N001	38	- 58	0.0094		F	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0656 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/19/2007	N001	38	- 58	234		F	#		
Ammonia Total as N	mg/L	12/19/2007	N001	38	- 58	58		F	#	10	
Chloride	mg/L	12/19/2007	N001	38	- 58	15		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	12/19/2007	N001	38	- 58	22		F	#	.2	
Oxidation Reduction Potential	mV	12/19/2007	N001	38	- 58	134		F	#		
pH	s.u.	12/19/2007	N001	38	- 58	7.53		F	#		
Specific Conductance	umhos /cm	12/19/2007	N001	38	- 58	1077		F	#		
Sulfate	mg/L	12/19/2007	N001	38	- 58	200		F	#	5	
Temperature	C	12/19/2007	N001	38	- 58	14.6		F	#		
Turbidity	NTU	12/19/2007	N001	38	- 58	0.27		F	#		
Uranium	mg/L	12/19/2007	N001	38	- 58	0.0055		F	#	.000012	
Vanadium	mg/L	12/19/2007	N001	38	- 58	0.00049		UF	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0657 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/19/2007	N001	121	- 136	175		F	#		
Ammonia Total as N	mg/L	12/19/2007	0001	121	- 136	0.1	U	F	#	.1	
Ammonia Total as N	mg/L	12/19/2007	N001	121	- 136	0.1	U	F	#	.1	
Chloride	mg/L	12/19/2007	0001	121	- 136	6.6		F	#	1	
Chloride	mg/L	12/19/2007	N001	121	- 136	6.5		F	#	.4	
Gross Alpha	pCi/L	12/19/2007	0001	121	- 136	12.9		F	#	.616	2.23
Gross Alpha	pCi/L	12/19/2007	N001	121	- 136	14.3		F	#	.649	2.48
Gross Beta	pCi/L	12/19/2007	0001	121	- 136	6.54		F	#	1.34	1.38
Gross Beta	pCi/L	12/19/2007	N001	121	- 136	5.99		F	#	1.54	1.39
Nitrate + Nitrite as Nitrogen	mg/L	12/19/2007	0001	121	- 136	3.3		F	#	.02	
Nitrate + Nitrite as Nitrogen	mg/L	12/19/2007	N001	121	- 136	2.9		F	#	.02	
Oxidation Reduction Potential	mV	12/19/2007	N001	121	- 136	159.1		F	#		
pH	s.u.	12/19/2007	N001	121	- 136	7.78		F	#		
Radium-226	pCi/L	12/19/2007	0001	121	- 136	-.0319	U	F	#	.699	.367
Radium-226	pCi/L	12/19/2007	N001	121	- 136	-.033	U	F	#	.621	.317
Radium-228	pCi/L	12/19/2007	0001	121	- 136	0.478	U	F	#	.659	.358
Radium-228	pCi/L	12/19/2007	0002	121	- 136	0.4	U	RF	#	1.47	.715

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0657 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Radium-228	pCi/L	12/19/2007	N001	121	- 136	0.546	U	F	#	.609	.349
Radium-228	pCi/L	12/19/2007	N003	121	- 136	1	U	RF	#	1.53	.813
Specific Conductance	umhos /cm	12/19/2007	N001	121	- 136	405		F	#		
Sulfate	mg/L	12/19/2007	0001	121	- 136	40		F	#	2.5	
Sulfate	mg/L	12/19/2007	N001	121	- 136	43		F	#	1	
Temperature	C	12/19/2007	N001	121	- 136	14.37		F	#		
Turbidity	NTU	12/19/2007	N001	121	- 136	0.53		F	#		
Uranium	mg/L	12/19/2007	0001	121	- 136	0.023		F	#	.000012	
Uranium	mg/L	12/19/2007	N001	121	- 136	0.024		F	#	.000012	
Uranium-234	pCi/L	12/19/2007	0001	121	- 136	8		F	#	.0477	1.33
Uranium-234	pCi/L	12/19/2007	N001	121	- 136	9.28		F	#	.0604	1.76
Uranium-235	pCi/L	12/19/2007	0001	121	- 136	0.375		F	#	.0145	.108
Uranium-235	pCi/L	12/19/2007	N001	121	- 136	0.36		F	#	.0711	.15
Uranium-238	pCi/L	12/19/2007	0001	121	- 136	7.32		F	#	.0391	1.22
Uranium-238	pCi/L	12/19/2007	N001	121	- 136	8.61		F	#	.0834	1.64
Vanadium	mg/L	12/19/2007	0001	121	- 136	0.062		F	#	.00032	
Vanadium	mg/L	12/19/2007	N001	121	- 136	0.064		F	#	.00032	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0662 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/19/2007	N001	37.5	- 67.5	180		F	#		
Ammonia Total as N	mg/L	12/19/2007	N001	37.5	- 67.5	0.1	U	F	#	.1	
Chloride	mg/L	12/19/2007	N001	37.5	- 67.5	11		F	#	2	
Gross Alpha	pCi/L	12/19/2007	N001	37.5	- 67.5	426		F	#	2.5	68.5
Gross Beta	pCi/L	12/19/2007	N001	37.5	- 67.5	125		F	#	5.32	20.5
Nitrate + Nitrite as Nitrogen	mg/L	12/19/2007	N001	37.5	- 67.5	24		F	#	.2	
Oxidation Reduction Potential	mV	12/19/2007	N001	37.5	- 67.5	150.6		F	#		
pH	s.u.	12/19/2007	N001	37.5	- 67.5	7.35		F	#		
Radium-226	pCi/L	12/19/2007	N001	37.5	- 67.5	-.031	U	F	#	.696	.367
Radium-228	pCi/L	12/19/2007	N001	37.5	- 67.5	0.266	U	F	#	.602	.303
Radium-228	pCi/L	12/19/2007	N003	37.5	- 67.5	0.279	U	RF	#	.598	.303
Specific Conductance	umhos/cm	12/19/2007	N001	37.5	- 67.5	1398		F	#		
Sulfate	mg/L	12/19/2007	N001	37.5	- 67.5	610		F	#	5	
Temperature	C	12/19/2007	N001	37.5	- 67.5	15.02		F	#		
Turbidity	NTU	12/19/2007	N001	37.5	- 67.5	0.75		F	#		
Uranium	mg/L	12/19/2007	N001	37.5	- 67.5	0.66		F	#	.00058	
Uranium-234	pCi/L	12/19/2007	N001	37.5	- 67.5	233		F	#	.612	39.4

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0662 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Uranium-235	pCi/L	12/19/2007	N001	37.5	- 67.5	10.3		F	#	.21	2.47
Uranium-238	pCi/L	12/19/2007	N001	37.5	- 67.5	230		F	#	.178	38.9
Vanadium	mg/L	12/19/2007	N001	37.5	- 67.5	0.027		F	#	.00016	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0669 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	34	- 54	214		F	#		
Ammonia Total as N	mg/L	12/18/2007	N001	34	- 54	2.7		F	#	.1	
Chloride	mg/L	12/18/2007	N001	34	- 54	9		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	34	- 54	8.2		F	#	.05	
Oxidation Reduction Potential	mV	12/18/2007	N001	34	- 54	127.5		F	#		
pH	s.u.	12/18/2007	N001	34	- 54	7.65		F	#		
Specific Conductance	umhos /cm	12/18/2007	N001	34	- 54	638		F	#		
Sulfate	mg/L	12/18/2007	N001	34	- 54	110		F	#	2.5	
Temperature	C	12/18/2007	N001	34	- 54	15.46		F	#		
Turbidity	NTU	12/18/2007	N001	34	- 54	0.4		F	#		
Uranium	mg/L	12/18/2007	N001	34	- 54	0.006		F	#	.000012	
Vanadium	mg/L	12/18/2007	N001	34	- 54	0.054		F	#	.00032	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0760 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	0001	55	- 75	187		FQ	#		
Ammonia Total as N	mg/L	12/18/2007	0001	55	- 75	0.1	U	FQ	#	.1	
Chloride	mg/L	12/18/2007	0001	55	- 75	10		FQ	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	0001	55	- 75	0.01	U	FQ	#	.01	
Oxidation Reduction Potential	mV	12/18/2007	N001	55	- 75	-123		FQ	#		
pH	s.u.	12/18/2007	N001	55	- 75	8.29		FQ	#		
Specific Conductance	umhos/cm	12/18/2007	N001	55	- 75	522		FQ	#		
Sulfate	mg/L	12/18/2007	0001	55	- 75	95		FQ	#	2.5	
Temperature	C	12/18/2007	N001	55	- 75	15.73		FQ	#		
Turbidity	NTU	12/18/2007	N001	55	- 75	31.3		FQ	#		
Uranium	mg/L	12/18/2007	0001	55	- 75	0.00025		FQ	#	.000012	
Vanadium	mg/L	12/18/2007	0001	55	- 75	0.0001	B	UFQ	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0761 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	39	- 49	82		F	#		
Ammonia Total as N	mg/L	12/18/2007	N001	39	- 49	0.1	U	F	#	.1	
Chloride	mg/L	12/18/2007	N001	39	- 49	15		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	39	- 49	37		F	#	.2	
Oxidation Reduction Potential	mV	12/18/2007	N001	39	- 49	170.1		F	#		
pH	s.u.	12/18/2007	N001	39	- 49	7.41		F	#		
Specific Conductance	umhos/cm	12/18/2007	N001	39	- 49	1397		F	#		
Sulfate	mg/L	12/18/2007	N001	39	- 49	530		F	#	5	
Temperature	C	12/18/2007	N001	39	- 49	15.85		F	#		
Turbidity	NTU	12/18/2007	N001	39	- 49	9.47		F	#		
Uranium	mg/L	12/18/2007	N001	39	- 49	0.029		F	#	.000012	
Vanadium	mg/L	12/18/2007	N001	39	- 49	0.0019		F	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0762 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	29	- 49	257		F	#		
Ammonia Total as N	mg/L	12/18/2007	N001	29	- 49	0.1	U	F	#	.1	
Chloride	mg/L	12/18/2007	N001	29	- 49	71		F	#	10	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	29	- 49	79		F	#	.5	
Oxidation Reduction Potential	mV	12/18/2007	N001	29	- 49	208.5		F	#		
pH	s.u.	12/18/2007	N001	29	- 49	7.54		F	#		
Specific Conductance	umhos /cm	12/18/2007	N001	29	- 49	3570		F	#		
Sulfate	mg/L	12/18/2007	N001	29	- 49	1600		F	#	25	
Temperature	C	12/18/2007	N001	29	- 49	15.39		F	#		
Turbidity	NTU	12/18/2007	N001	29	- 49	5.39		F	#		
Uranium	mg/L	12/18/2007	N001	29	- 49	0.011		F	#	.000012	
Vanadium	mg/L	12/18/2007	N001	29	- 49	0.0093		F	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0764 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	47	- 52	104		FQ	#		
Ammonia Total as N	mg/L	12/18/2007	N001	47	- 52	0.1	U	FQ	#	.1	
Chloride	mg/L	12/18/2007	N001	47	- 52	12		FQ	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	47	- 52	42		FQ	#	.5	
Oxidation Reduction Potential	mV	12/18/2007	N001	47	- 52	154.6		FQ	#		
pH	s.u.	12/18/2007	N001	47	- 52	7.71		FQ	#		
Specific Conductance	umhos /cm	12/18/2007	N001	47	- 52	1251		FQ	#		
Sulfate	mg/L	12/18/2007	N001	47	- 52	340		FQ	#	5	
Temperature	C	12/18/2007	N001	47	- 52	15.6		FQ	#		
Turbidity	NTU	12/18/2007	N001	47	- 52	1.49		FQ	#		
Uranium	mg/L	12/18/2007	N001	47	- 52	0.013		FQ	#	.000012	
Vanadium	mg/L	12/18/2007	N001	47	- 52	0.016		FQ	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0765 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	58.6	- 88.7	171		F	#		
Ammonia Total as N	mg/L	12/18/2007	N001	58.6	- 88.7	150		F	#	10	
Chloride	mg/L	12/18/2007	N001	58.6	- 88.7	21		F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	58.6	- 88.7	120		F	#	1	
Oxidation Reduction Potential	mV	12/18/2007	N001	58.6	- 88.7	-18.3		F	#		
pH	s.u.	12/18/2007	N001	58.6	- 88.7	7.41		F	#		
Specific Conductance	umhos /cm	12/18/2007	N001	58.6	- 88.7	2673		F	#		
Sulfate	mg/L	12/18/2007	N001	58.6	- 88.7	680		F	#	10	
Temperature	C	12/18/2007	N001	58.6	- 88.7	15.79		F	#		
Turbidity	NTU	12/18/2007	N001	58.6	- 88.7	0.25		F	#		
Uranium	mg/L	12/18/2007	N001	58.6	- 88.7	0.011		F	#	.000012	
Vanadium	mg/L	12/18/2007	N001	58.6	- 88.7	0.0077		F	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0767 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	43.5	- 63.5	170		F	#		
Ammonia Total as N	mg/L	12/18/2007	N001	43.5	- 63.5	0.1	U	F	#	.1	
Chloride	mg/L	12/18/2007	N001	43.5	- 63.5	5.7		F	#	.4	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	43.5	- 63.5	0.01	U	F	#	.01	
Oxidation Reduction Potential	mV	12/18/2007	N001	43.5	- 63.5	-125.2		F	#		
pH	s.u.	12/18/2007	N001	43.5	- 63.5	8.06		F	#		
Specific Conductance	umhos/cm	12/18/2007	N001	43.5	- 63.5	400		F	#		
Sulfate	mg/L	12/18/2007	N001	43.5	- 63.5	35		F	#	1	
Temperature	C	12/18/2007	N001	43.5	- 63.5	14.68		F	#		
Turbidity	NTU	12/18/2007	N001	43.5	- 63.5	4.28		F	#		
Uranium	mg/L	12/18/2007	N001	43.5	- 63.5	0.00066		F	#	.000012	
Vanadium	mg/L	12/18/2007	N001	43.5	- 63.5	0.00015	B	UF	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0768 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	24.4	- 44.4	193		F	#		
Ammonia Total as N	mg/L	12/18/2007	N001	24.4	- 44.4	0.49		F	#	.1	
Chloride	mg/L	12/18/2007	N001	24.4	- 44.4	13		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	24.4	- 44.4	0.01	U	F	#	.01	
Oxidation Reduction Potential	mV	12/18/2007	N001	24.4	- 44.4	-193.4		F	#		
pH	s.u.	12/18/2007	N001	24.4	- 44.4	8.33		F	#		
Specific Conductance	umhos /cm	12/18/2007	N001	24.4	- 44.4	484		F	#		
Sulfate	mg/L	12/18/2007	N001	24.4	- 44.4	76		F	#	2.5	
Temperature	C	12/18/2007	N001	24.4	- 44.4	15		F	#		
Turbidity	NTU	12/18/2007	N001	24.4	- 44.4	5.61		F	#		
Uranium	mg/L	12/18/2007	N001	24.4	- 44.4	0.000049	B	UF	#	.000012	
Vanadium	mg/L	12/18/2007	N001	24.4	- 44.4	0.00019	B	FJ	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0770 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	54.9	- 64.9	238		F	#		
Ammonia Total as N	mg/L	12/18/2007	N001	54.9	- 64.9	40		F	#	5	
Chloride	mg/L	12/18/2007	N001	54.9	- 64.9	15		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	54.9	- 64.9	17		F	#	.2	
Oxidation Reduction Potential	mV	12/18/2007	N001	54.9	- 64.9	83.2		F	#		
pH	s.u.	12/18/2007	N001	54.9	- 64.9	7.59		F	#		
Specific Conductance	umhos /cm	12/18/2007	N001	54.9	- 64.9	1075		F	#		
Sulfate	mg/L	12/18/2007	N001	54.9	- 64.9	230		F	#	5	
Temperature	C	12/18/2007	N001	54.9	- 64.9	14.15		F	#		
Turbidity	NTU	12/18/2007	N001	54.9	- 64.9	0.9		F	#		
Uranium	mg/L	12/18/2007	N001	54.9	- 64.9	0.0058		F	#	.000012	
Vanadium	mg/L	12/18/2007	N001	54.9	- 64.9	0.00066		UF	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0771 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/18/2007	N001	57.4	- 77.4	296		FQ	#		
Ammonia Total as N	mg/L	12/18/2007	N001	57.4	- 77.4	230		FQ	#	50	
Chloride	mg/L	12/18/2007	N001	57.4	- 77.4	24		FQ	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	12/18/2007	N001	57.4	- 77.4	180		FQ	#	1	
Oxidation Reduction Potential	mV	12/18/2007	N001	57.4	- 77.4	174		FQ	#		
pH	s.u.	12/18/2007	N001	57.4	- 77.4	7.48		FQ	#		
Specific Conductance	umhos/cm	12/18/2007	N001	57.4	- 77.4	4446		FQ	#		
Sulfate	mg/L	12/18/2007	N001	57.4	- 77.4	1700		FQ	#	10	
Temperature	C	12/18/2007	N001	57.4	- 77.4	14.9		FQ	#		
Turbidity	NTU	12/18/2007	N001	57.4	- 77.4	1.8		FQ	#		
Uranium	mg/L	12/18/2007	N001	57.4	- 77.4	0.014		FQ	#	.000012	
Vanadium	mg/L	12/18/2007	N001	57.4	- 77.4	0.01		FQ	#	.000095	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0772 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	12/19/2007	N001	7.4	- 27.4	228		F	#		
Ammonia Total as N	mg/L	12/19/2007	N001	7.4	- 27.4	7.9		F	#	.5	
Chloride	mg/L	12/19/2007	N001	7.4	- 27.4	17		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	12/19/2007	N001	7.4	- 27.4	1.2		F	#	.01	
Oxidation Reduction Potential	mV	12/19/2007	N001	7.4	- 27.4	-106		F	#		
pH	s.u.	12/19/2007	N001	7.4	- 27.4	7.57		F	#		
Specific Conductance	umhos /cm	12/19/2007	N001	7.4	- 27.4	770		F	#		
Sulfate	mg/L	12/19/2007	N001	7.4	- 27.4	140		F	#	5	
Temperature	C	12/19/2007	N001	7.4	- 27.4	14.6		F	#		
Turbidity	NTU	12/19/2007	N001	7.4	- 27.4	1.32		F	#		
Uranium	mg/L	12/19/2007	N001	7.4	- 27.4	0.0074		F	#	.000012	
Vanadium	mg/L	12/19/2007	N001	7.4	- 27.4	0.022		F	#	.00016	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0774 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Alkalinity, Total (As CaCO3)	mg/L	12/19/2007	N001	45	-	55	162		F	#		
Ammonia Total as N	mg/L	12/19/2007	N001	45	-	55	0.1	U	F	#	.1	
Chloride	mg/L	12/19/2007	N001	45	-	55	5.5		F	#	1	
Gross Alpha	pCi/L	12/19/2007	N001	45	-	55	21.3		F	#	.689	3.59
Gross Beta	pCi/L	12/19/2007	N001	45	-	55	9.39		F	#	1.4	1.79
Nitrate + Nitrite as Nitrogen	mg/L	12/19/2007	N001	45	-	55	2		F	#	.02	
Oxidation Reduction Potential	mV	12/19/2007	N001	45	-	55	129.9		F	#		
pH	s.u.	12/19/2007	N001	45	-	55	7.84		F	#		
Radium-226	pCi/L	12/19/2007	N001	45	-	55	0.0873	U	F	#	.507	.28
Radium-228	pCi/L	12/19/2007	N001	45	-	55	0.462	U	F	#	.619	.339
Radium-228	pCi/L	12/19/2007	N003	45	-	55	0.0484	U	RF	#	1.53	.718
Specific Conductance	umhos/cm	12/19/2007	N001	45	-	55	404		F	#		
Sulfate	mg/L	12/19/2007	N001	45	-	55	43		F	#	2.5	
Temperature	C	12/19/2007	N001	45	-	55	15.3		F	#		
Turbidity	NTU	12/19/2007	N001	45	-	55	3.04		F	#		
Uranium	mg/L	12/19/2007	N001	45	-	55	0.04		F	#	.000012	
Uranium-234	pCi/L	12/19/2007	N001	45	-	55	14.2		F	#	.031	2.32
Uranium-235	pCi/L	12/19/2007	N001	45	-	55	0.712		F	#	.0144	.167
Uranium-238	pCi/L	12/19/2007	N001	45	-	55	13.2		F	#	.0255	2.16

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 3/3/2008

Location: 0774 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft	BLS)			Lab	Data	QA		
Vanadium	mg/L	12/19/2007	N001	45	-	55	0.02		F	#	.00016	

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X,Y,Z Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique.
- X Location is undefined.
- J Estimated value.
- R Unusable result.

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

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Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 3/3/2008

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0604	C	4840.42	12/18/2007		6.61	4833.81	
0606	D	4864.73	12/19/2007		36.77	4827.96	
0607	D	4871.39	12/18/2007				D
0609	O	4879.99	12/18/2007				D
0619	O	4888.63	12/19/2007		58.85	4829.78	
0655	D	4862.06	12/18/2007		40.8	4821.26	
0656	D	4856.33	12/19/2007		37.43	4818.9	
0657	O	4878.99	12/19/2007		51.3	4827.69	
0662	D	4878.56	12/19/2007		50.7	4827.86	
0669	D	4867.19	12/18/2007		50.59	4816.6	
0760	D	4814.8	12/18/2007		25.82	4788.98	
0761	D	4835.02	12/18/2007		43.26	4791.76	
0762	D	4820.74	12/18/2007		32.04	4788.7	
0764	D	4851.53	12/18/2007		49.87	4801.66	
0765	D	4848.45	12/18/2007		36.14	4812.31	
0767	D	4808.25	12/18/2007		7.67	4800.58	
0768	D	4820.73	12/18/2007		14.61	4806.12	
0770	D	4857.26	12/18/2007		33.89	4823.37	
0771	D	4863.26	12/18/2007		42.57	4820.69	
0772	O	4847.6	12/19/2007		12.66	4834.94	
0774	O	4880.14	12/19/2007		50.68	4829.46	

FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWN GRADIENT F OFF SITE
 N UNKNOWN O ON SITE U UPGRADIENT

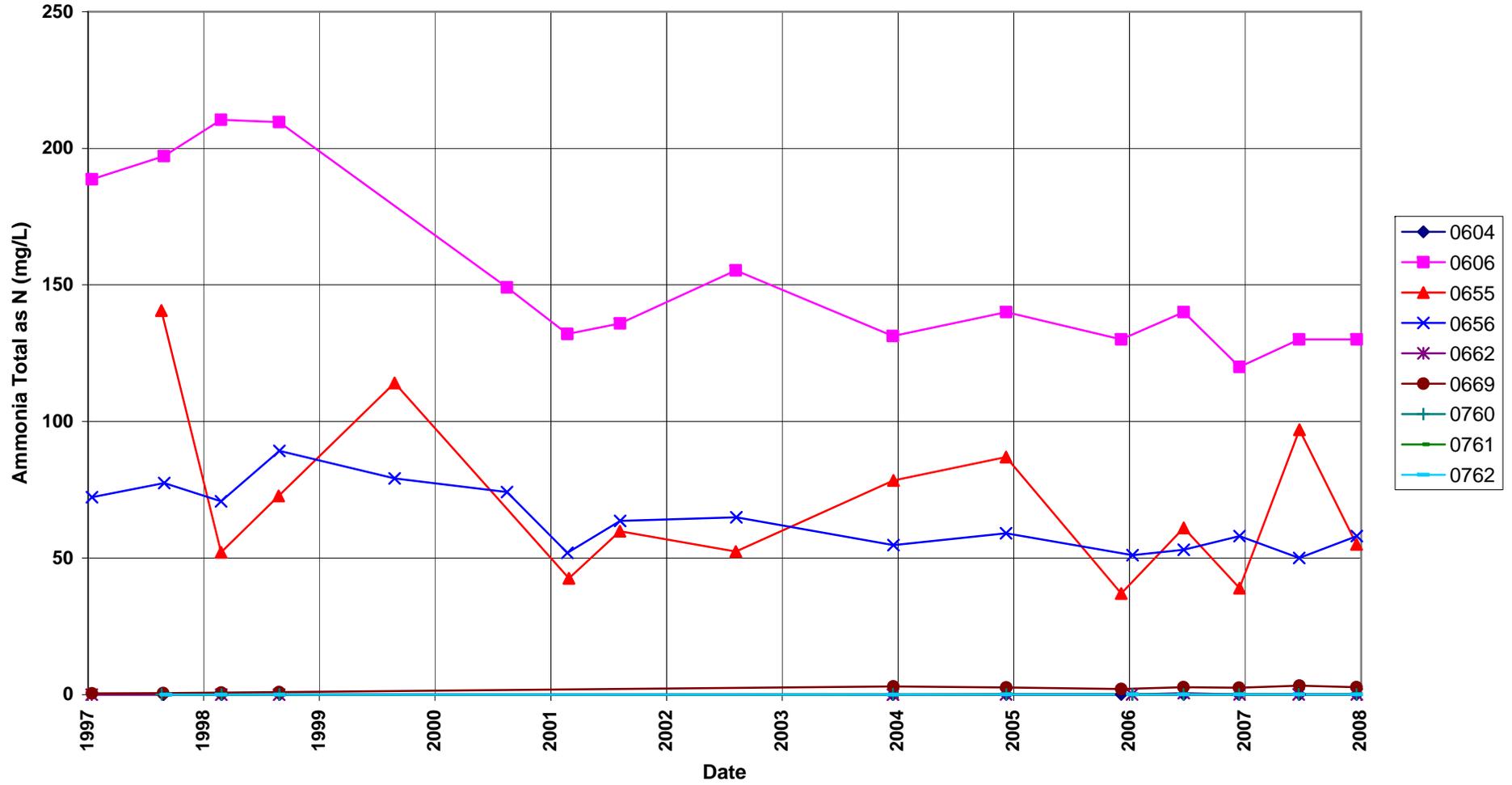
WATER LEVEL FLAGS: D Dry F FLOWING

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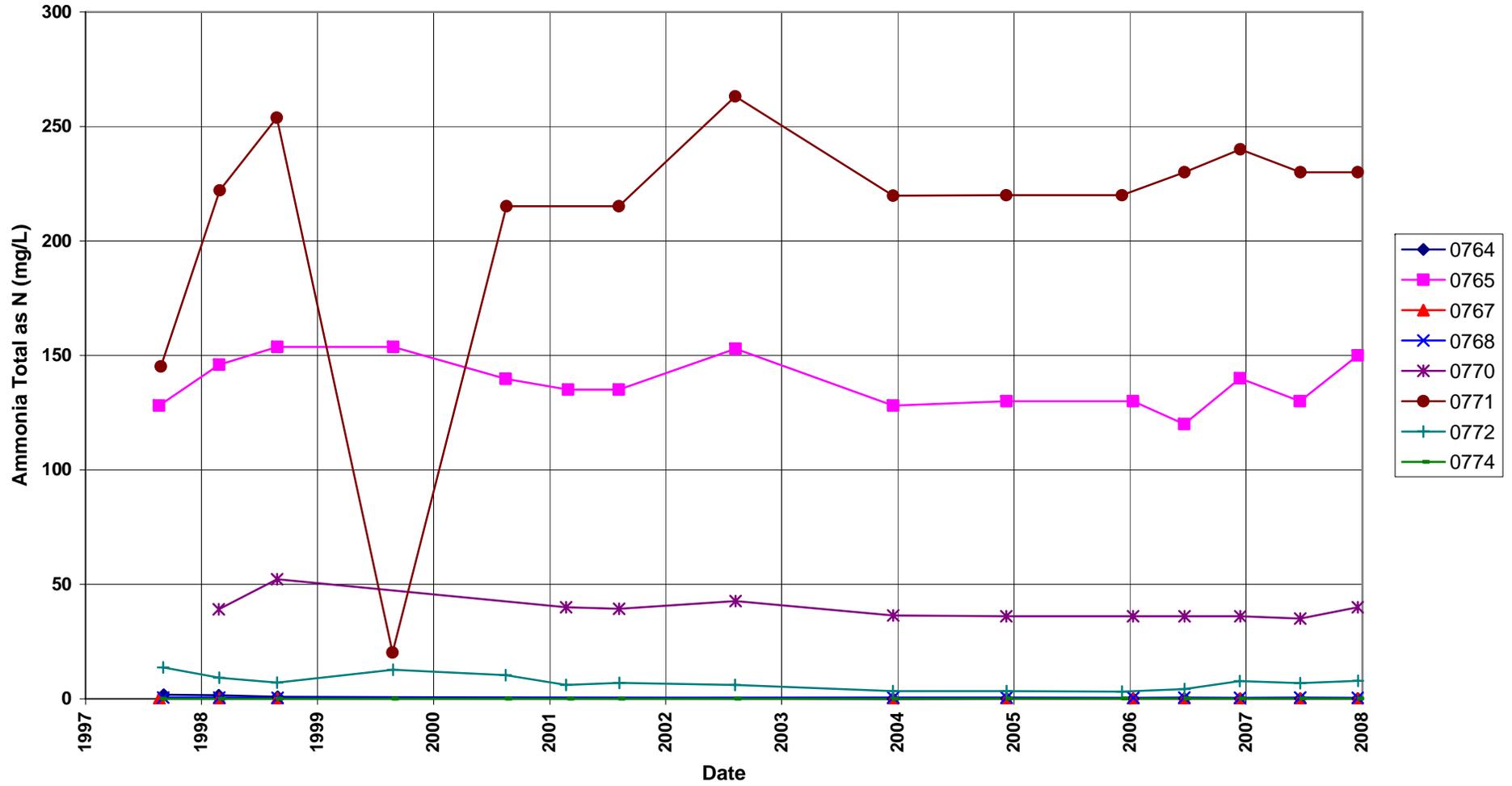
Time Versus Concentration Graphs

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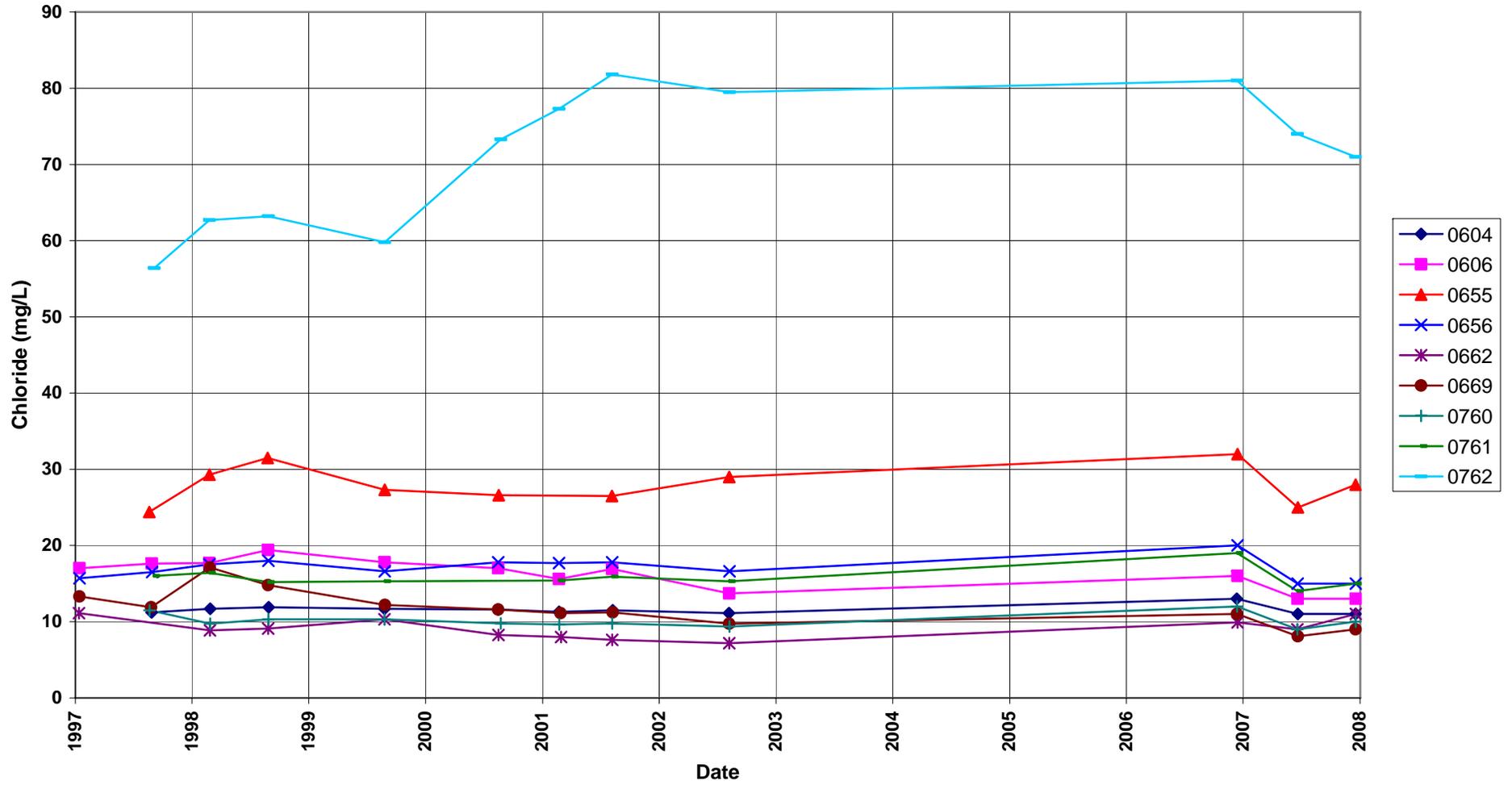
Monument Valley Processing Site Ammonia Total as N Concentration



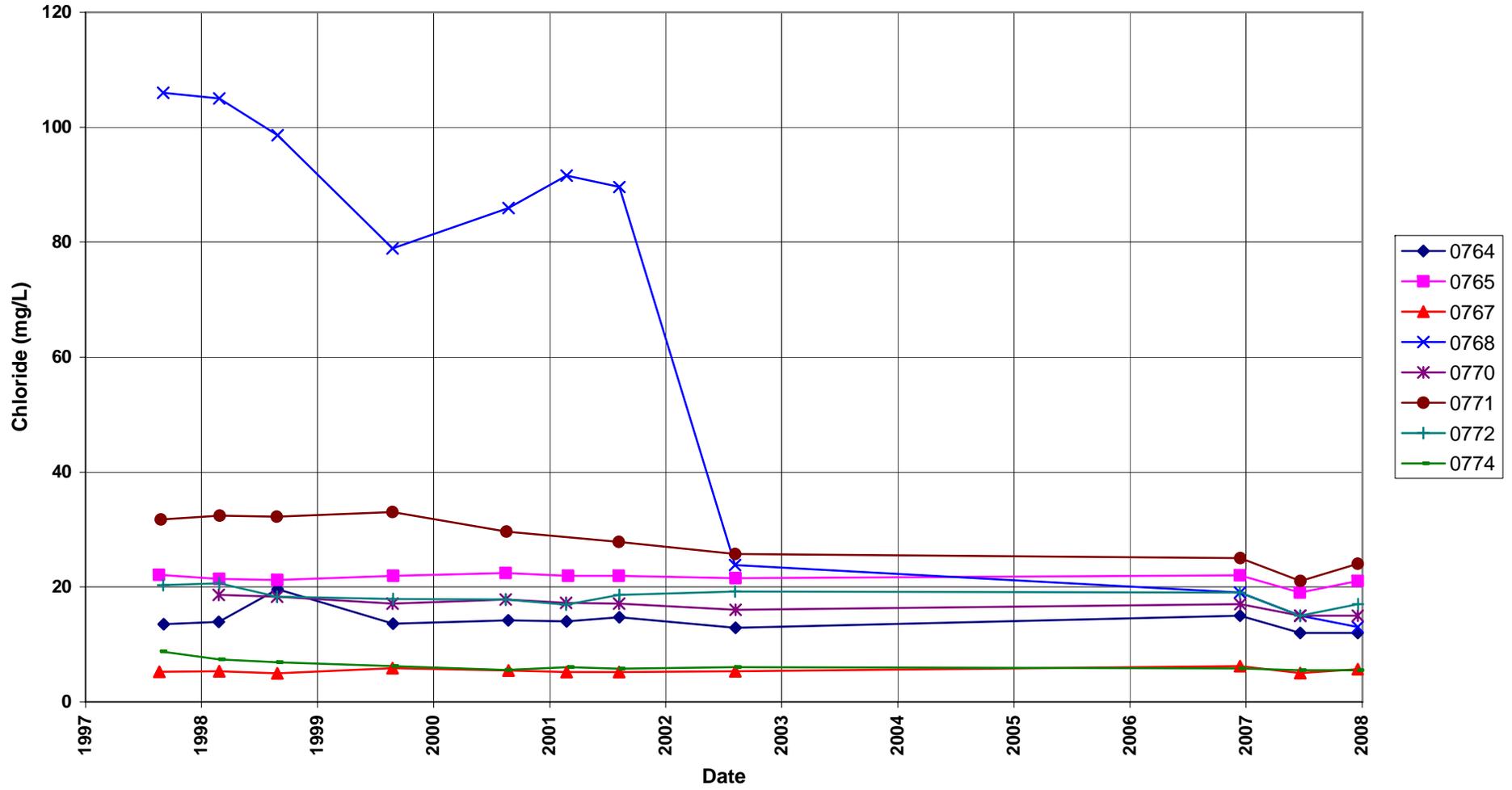
Monument Valley Processing Site Ammonia Total as N Concentration



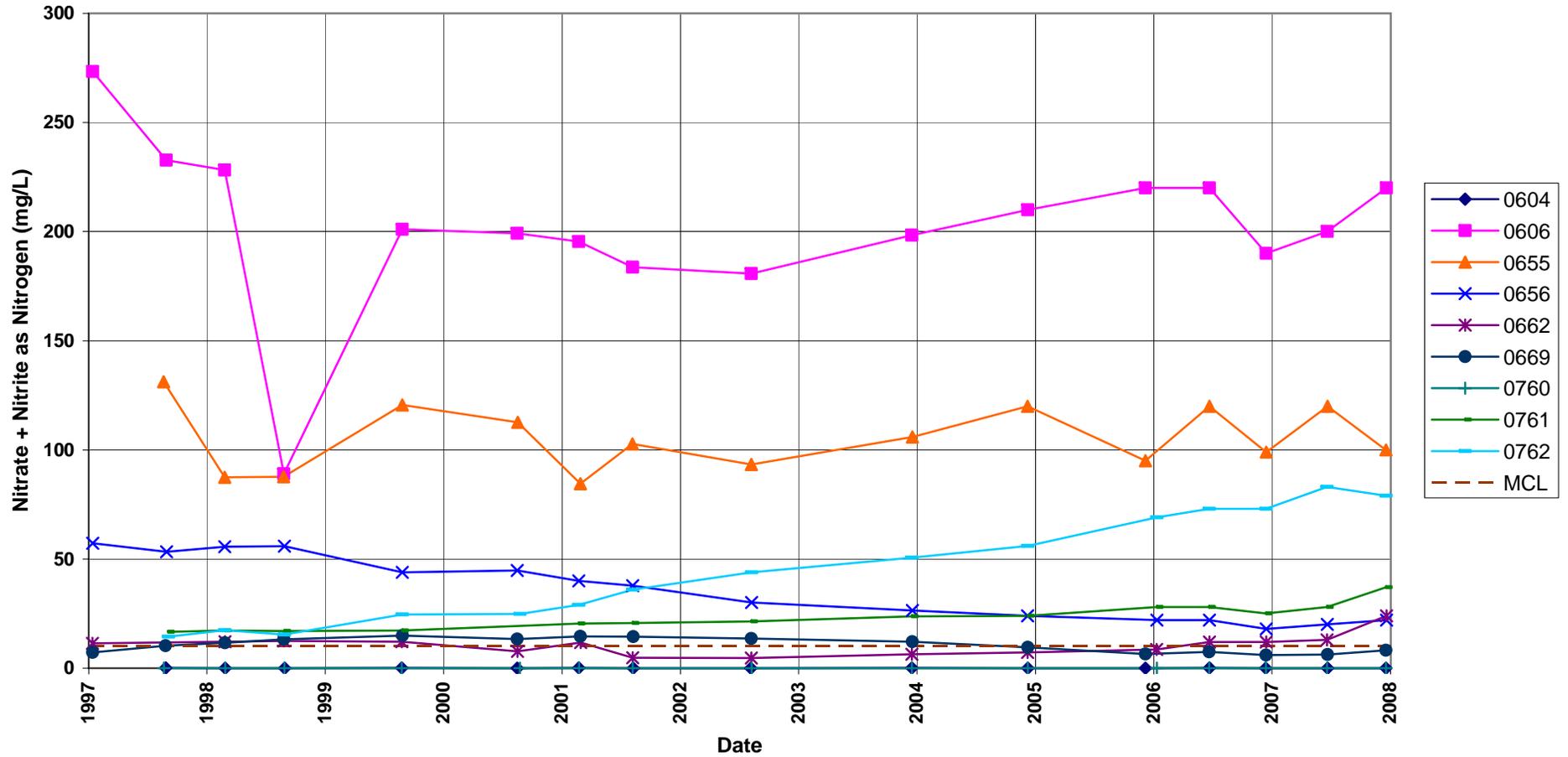
Monument Valley Processing Site Chloride Concentration



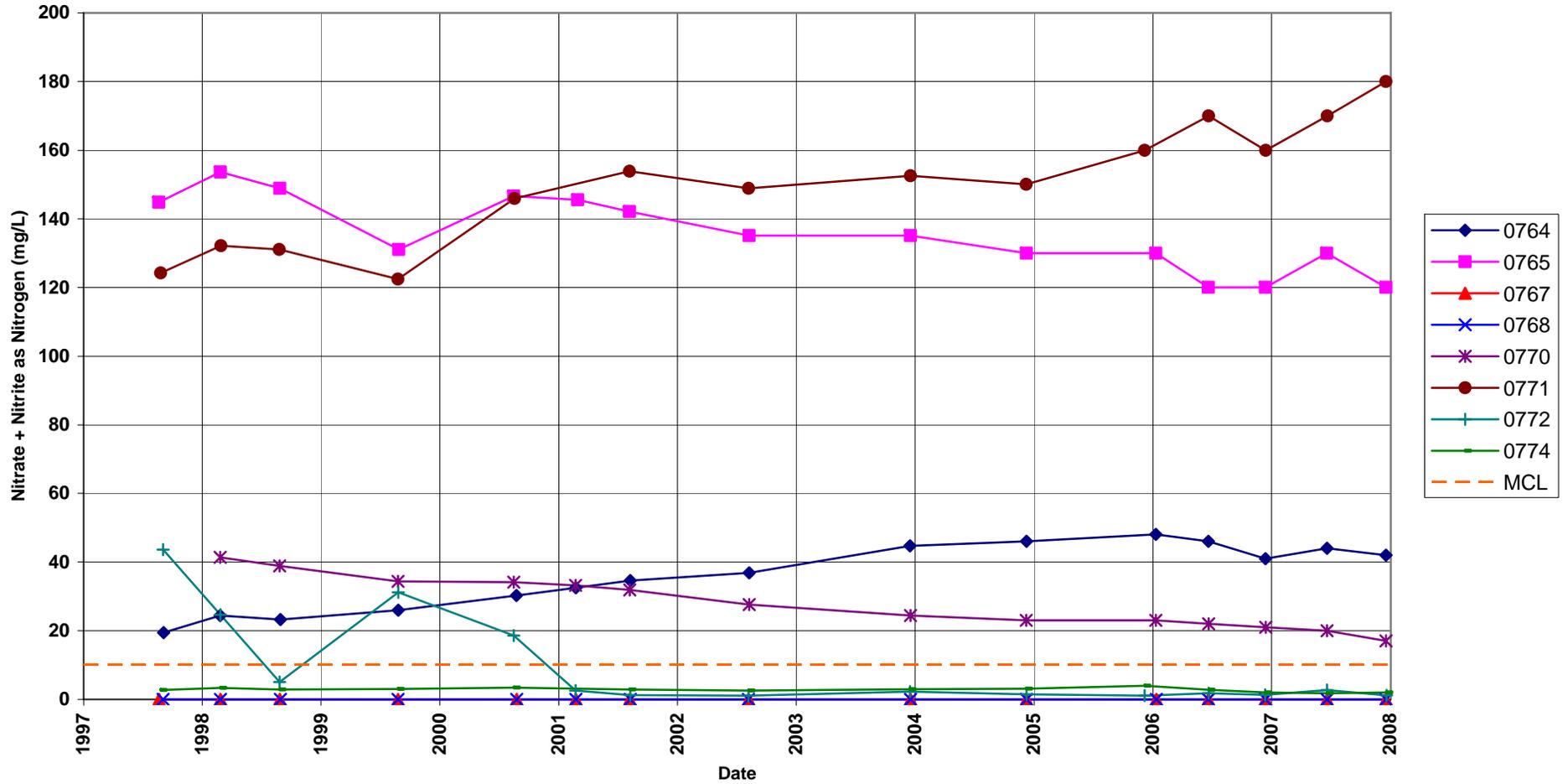
Monument Valley Processing Site Chloride Concentration



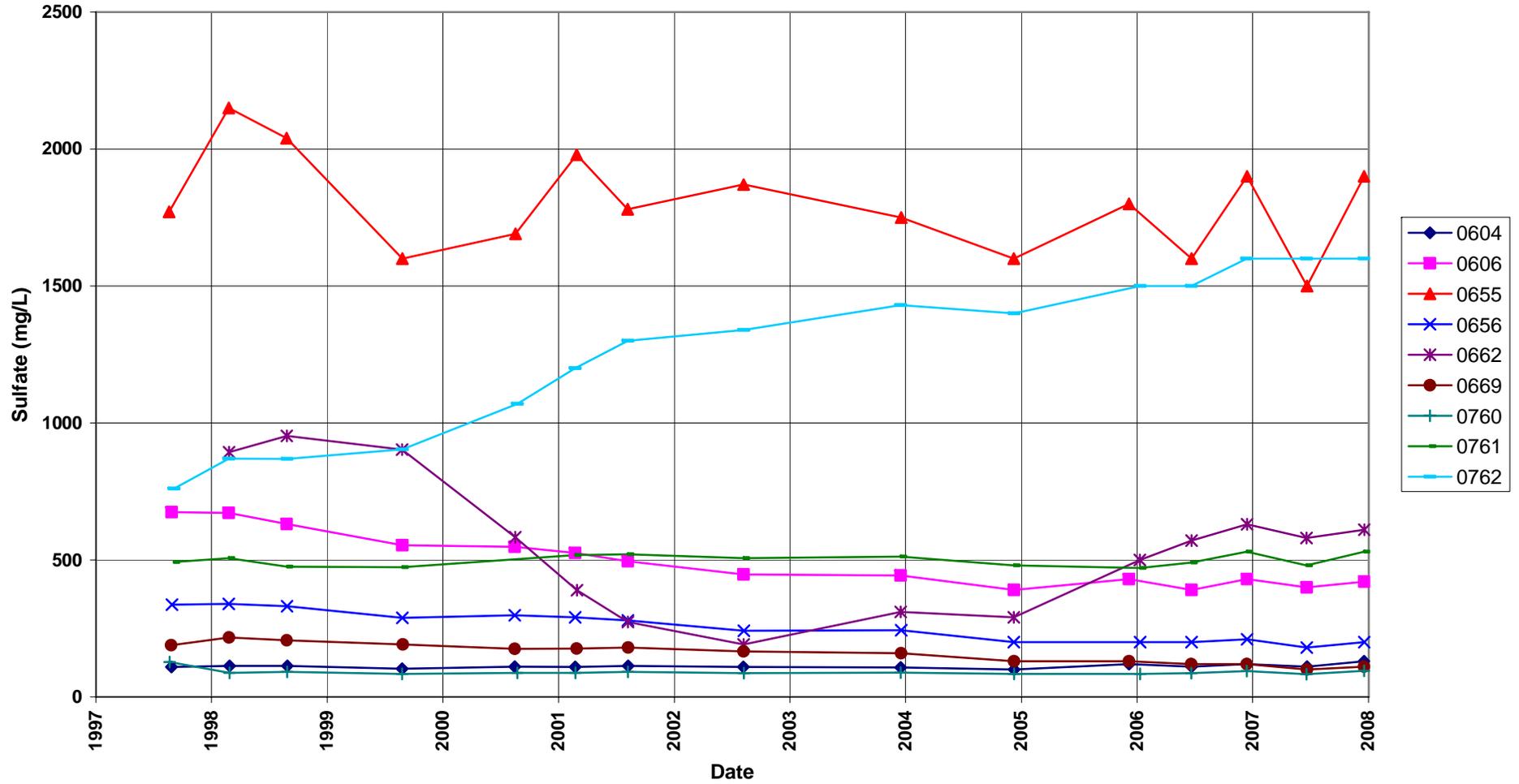
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
 Maximum Concentration Limit = 10.0 mg/L



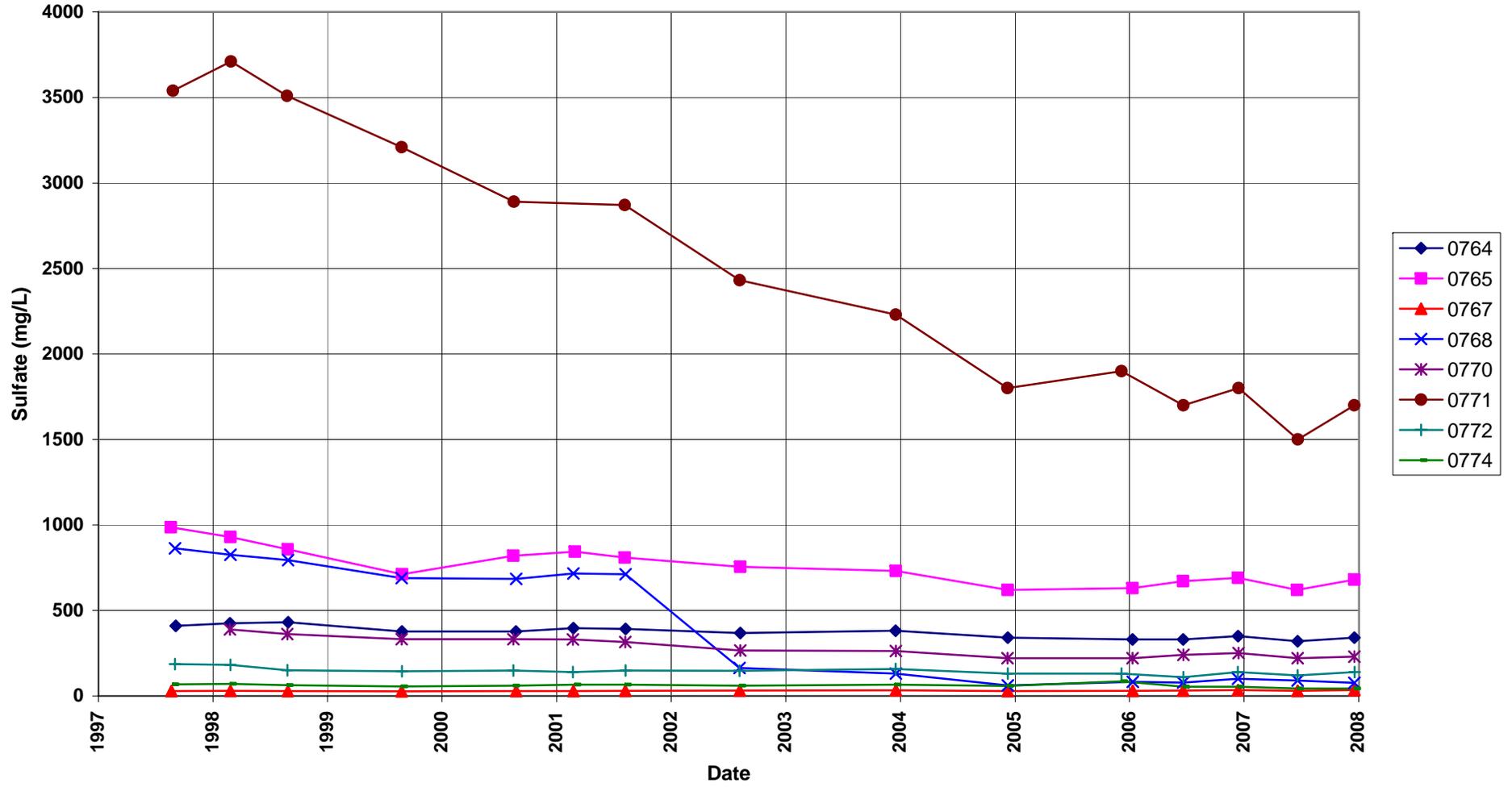
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
 Maximum Concentration Limit = 10.0 mg/L



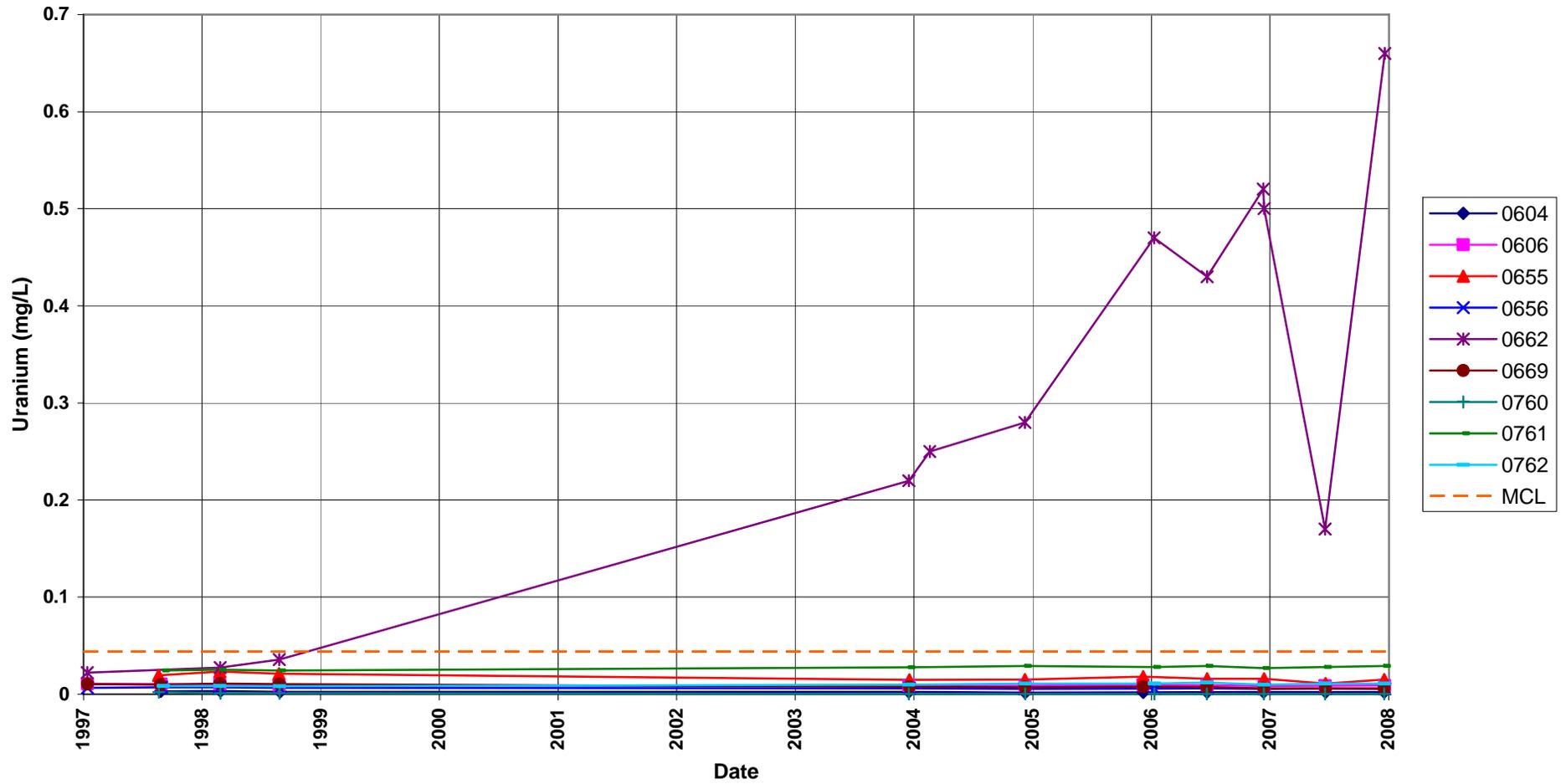
Monument Valley Processing Site Sulfate Concentration



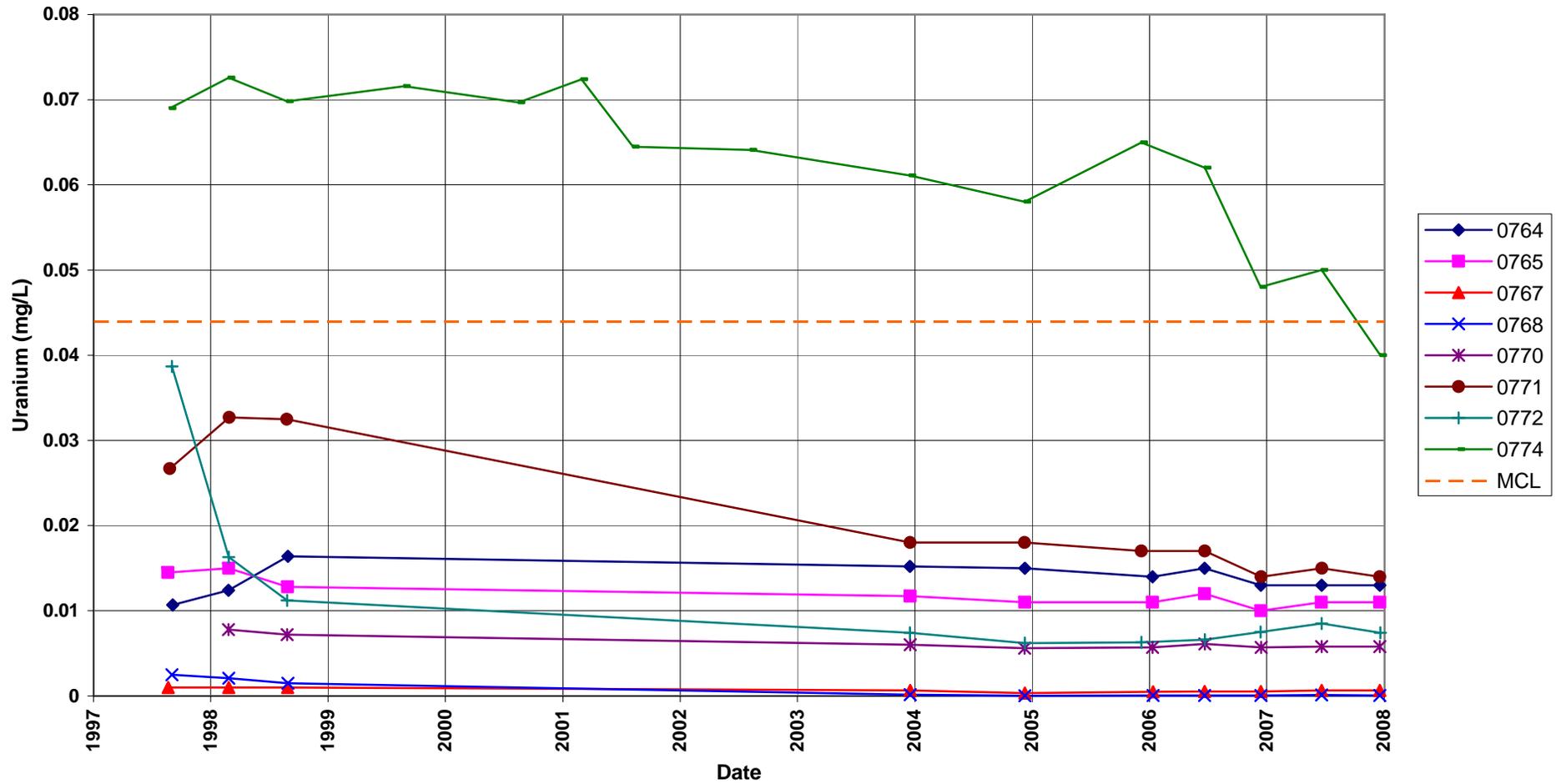
Monument Valley Processing Site Sulfate Concentration



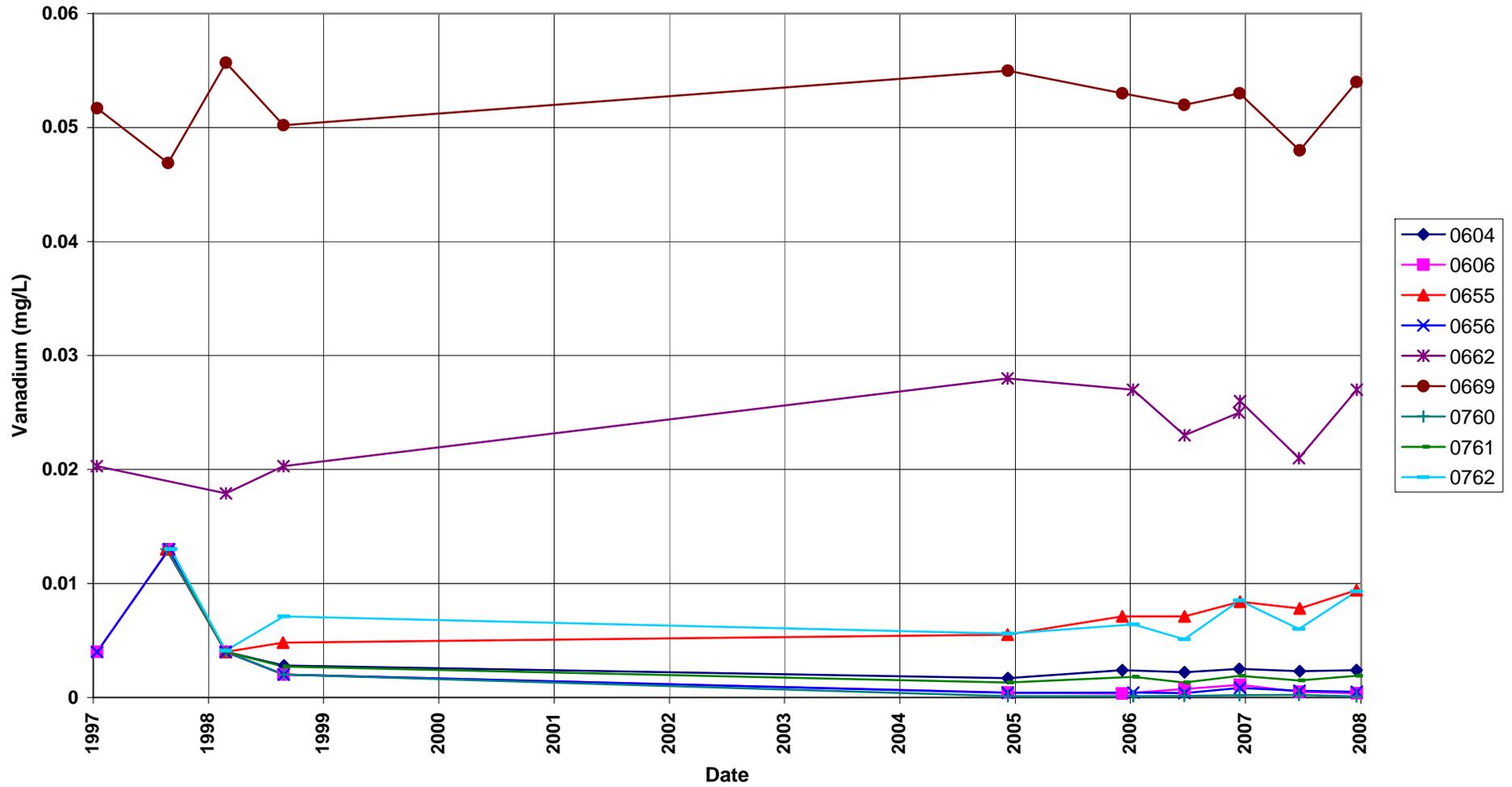
Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit = 0.044 mg/L



Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit = 0.044 mg/L



Monument Valley Processing Site Vanadium Concentration



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Attachment 3
Sampling and Analysis Work Order

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established 1959

Task Order ST08-01-1-114
Control Number 1000-T08-0113

November 7, 2007

Richard P. Bush
Site Manager
U.S. Department of Energy
Grand Junction Office
2597 B 3/4 Road
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AC13-02GJ79491, Stoller
December 2007 Environmental Sampling at Monument Valley, Arizona

Reference: FY 2008 LM Task Order No. ST08-01-1-114

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at Monument Valley, Arizona. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring. Water quality data will be collected from monitor wells at this site as part of the routine environmental sampling scheduled to begin the week of December 10, 2007.

The following list shows the monitor wells (with zone of completion) scheduled to be sampled during this event.

Well locations (filtered)*

604 Al	655 Al	662 Al	761 Al	765 Al	770 Al	772 Al
606 Al	656 Al	669 Al	762 Al	767 Al	771 Al	774 Al
619 Dc	657 Dc	760 Al	764 Al	768 Al		

*NOTE: Al = Alluvium; Dc = Dechelley Member of the Cutler Formation

QA/QC samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Access agreements are covered under the cooperative agreement.

If you have any questions, please call me at extension 6588 or Dave Miller at extension 6652.

Sincerely,

Clay Carpenter
Project Manager

CC/lcg/mat
Enclosures (3)

cc: S. E. Donovan, Stoller (e)
L. C. Goodknight, Stoller (e)
D. E. Miller, Stoller (e)
EDD Delivery (e)

cc w/o enclosures:
Correspondence Control File (Thru C. Weston) (e)

**Constituent Sampling
Breakdown
For Individual Sites**

Site	Monument Valley	
	Groundwater	Surface Water
Approx. No. Samples/yr	19	0
Field Measurements		
Alkalinity	X	
Dissolved Oxygen		
Redox Potential	X	
Residual Chlorine		
pH	X	
Specific Conductance	X	
Turbidity	X	
Temperature	X	
Laboratory Measurements		
Aluminum		
Ammonia as N (NH ₃ -N)	X	
Antimony		
Arsenic		
Barium		
Bromide		
Cadmium		
Calcium		
Chloride	X	
Chromium		
Cobalt		
Copper		
Fluoride		
Gamma Spec		
Gross Alpha	0619, 0657, 0662, and 0774 only	
Gross Beta		
Iron		
Lead		
Lead-210		
Magnesium		
Manganese		
Molybdenum		
Nickel		
Nickel-63		
Nitrate + Nitrite as N (NO ₃ +NO ₂)-N	X	
Nitrite		
PCBs		
Polonium-210		
Potassium		

Analyte	Groundwater	Surface Water
Radium-226	0619, 0657, 0662, and 0774 only	
Radium-228	0619, 0657, 0662, and 0774 only	
Selenium		
Sodium		
Strontium		
Sulfate	X	
Sulfide		
Thallium		
Thorium-230		
Tin		
Total Dissolved Solids		
Uranium	X	
Uranium-234, -238	0619, 0657, 0662, and 0774 only	
Vanadium	X	
Zinc		
Total Analytes	10	0

Note: All analyte samples are considered filtered unless stated otherwise. All private well samples are to be unfiltered. The total number of analytes does not include field parameters.

Attachment 4
Trip Report

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Memorandum

Control Number N/A

DATE: December 31, 2007

TO: David Miller

FROM: Jeff Walters

SUBJECT: Trip Report

Site: Monument Valley, Arizona

Date of Sampling Event: December 17 through 19, 2007.

Team Members: Joe Trevino, Jeff Price, Mike Stott (Fernald), and Jeff Walters

Number of Locations Sampled: 19 monitor wells and 1 duplicate.

Locations Not Sampled/Reason: None.

Location Specific Information: All wells were sampled for U, V, SO₄, Cl, NH₃-N, (NO₃+NO₂)-N. Additionally, four wells were sampled for the above plus GAB, Ra-226, Ra-228, and U Isotopes.

Date	Sample Time	Ticket Number	Sample Location	Notes	Water Levels
12/18/2007	0958	NFD 451	0762	Cat I	32.04
12/18/2007	1045	NFD 452	0760	Cat I, Filtered due to high turbidity (31.3).	25.82
12/18/2007	1140	NFD 453	0767	Cat I	7.67
12/18/2007	1210	NFD 454	0768	Cat I	14.61
12/18/2007	1240	NFD 455	0765	Cat I	36.14
12/18/2007	1410	NFD 456	0761	Cat I	43.26
12/18/2007	1430	NFD 457	0764	Cat II, Water at top of pump	49.87
12/18/2007	1515	NFD 458	0669	Cat I	50.59
12/18/2007	1555	NFD 459	0604	Cat I	6.61
12/18/2007	1625	NFD 460	0770	Cat I	33.89
12/18/2007	1630	NFK 737	0655	Cat I	40.80
12/18/2007	1700	NFK 738	0771	Cat II	42.57
12/19/2007	0920	NFK 739	0772	Cat I	12.53
12/19/2007	0945	NFK 740	0606	Cat I	36.77
12/19/2007	1030	NFK 741	0656	Cat I	37.43
12/19/2007	1110	NFK 742	0619	Cat I	58.85
12/19/2007	0955	NFD 461	0657	Cat I	51.30
12/19/2007	1200	NFD 462	2417	Duplicate of 0657 (Filtered)	-----
12/19/2007	1115	NFD 463	0662	Cat I	50.70
12/19/2007	1155	NFD 464	0774	Cat I	50.60

All samples were shipped via Fed-Ex from Grand Junction to Paragon Analytics on December 20, 2007.

Field Variance: None. All samples collected with turbidity under 10 NTU's were not filtered. The duplicate sample was filtered for comparison.

Quality Control Sample Cross Reference: Following is the false identification assigned to the quality control sample:

False ID	True ID	Sample Type	Ticket Number
2417	0657	Duplicate (Filtered)	NFD 462

Requisition Numbers Assigned: All samples were assigned to report identification number (RIN) 07121310.

Water Level Measurements: Water levels were measured at all sampled monitor wells. See table above. Also, water levels were measured in wells 0607 (Dry, TD-29.95), and 0609 (Dry, TD-12.55).

Well Inspection Summary: All wells were in good condition. Some locks are becoming difficult to open. Samplers spent a few minutes looking for well 0788 to see if it existed, but could not find a well in that area.

Equipment: All wells are equipped with either dedicated downhole and pumphead tubing or a bladder pump. Bladder pumps in wells 0657 and 0619 need to be replaced. Pumps are older models that allow some water to flow backward between pump cycles.

Regulatory: N/A

Institutional Controls

Fences, Gates, Locks: All were OK.

Signs: All appeared OK.

Trespassing/Site Disturbances: None observed.

Site Issues: None observed.

Disposal Cell/Drainage Structure Integrity: N/A

Vegetation/Noxious Weed Concerns: N/A

Maintenance Requirements: None.

Access Issues: None

Corrective Action Required/Taken: None

(JWW/lcg)

cc: R. P. Bush, DOE (e)
S. E. Donovan, Stoller (e)
EDD Delivery (e)